

REMARKS

This is in response to the Office Action dated September 11, 2002 in which claims 1-27 are pending and claims 21-27 were withdrawn from consideration. With this response, claims 1-4 and 6-20 are amended and claim 28 is added. All pending claims 1-28 are presented for consideration and favorable action.

Section 1 of the Office Action indicates that certified copies of the Korean applications for foreign priority are requested. Applicants, under separate paper, file herewith.

Section 2 of the Office Action indicated that FIG. 1 should be designated as --Prior Art--. Figure 1 is amended accordingly.

Section 3 of the Office Action objects to the drawings as failing to comply with 37 C.F.R. 1.84(p)(5) because they do not include the following reference signs 40 and 42. Applicants have amended the Specification on page 6 from line 23 to page 7, line 5 to clarify reference numbers 40 and 42 as shown in FIGS. 2 and 3. Accordingly, Applicants respectfully believe that the objection to the drawings may be withdrawn.

Section 4 of the Office Action objects to various informalities in the Specification. Pages 5 through 10 are amended herein. Accordingly, Applicants respectfully believe that the objection to the Specification may now be withdrawn.

In section 6 of the Office Action, the Examiner rejected claims 1-20 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Claims 1-4, 6-7, 9-10, 12-14, 16 and 18-19 have been amended to address this rejection. However, claim 7, line 5 is rejected as being unclear as to what it is meant

by "in a key way". Claim 7 and the Specification on page 7, line 5 and 16 and page 8, line 3 have been amended to correctly spell the term as "keyway." According to Merriam-Webster's Collegiate Dictionary, the term keyway is defined as a groove or channel for a key. In addition, "the floor cloth" of claim 17, line 2 has been rejected as not being previously recited in the claims. With the Amendment to claim 1 as discussed below, the floor cloth now has proper antecedent basis. Claim 8, 15 and 17 have also been amended to reflect minor grammatical errors and correct dependency. Accordingly Applicants respectfully believe all rejections based on the indefiniteness of the claims may be withdrawn.

In section 7 of the Office Action, claim 1 was rejected under 35 U.S.C. §102(b) as being anticipated by Dutcher (U.S. Patent No. 4,052,767). In section 9 of the Office Action claims 1-2 and 15 were rejected under 35 U.S.C. §102(b) as being anticipated by Jones (U.S. Patent No. 4,457,042). Lastly, in section 10 of the Office Action claims 1-2 were rejected under 35 U.S.C. §102(b) as being anticipated by Burgoon (U.S. Patent No. 3,663,985). Claim 1 has been amended to clarify that the floor cloth rotates in a plane substantially parallel to the cleaning surface.

The cited references do not teach Applicant's claimed invention. Dutcher discloses a rotary brush (FIG. 1, No. 12) and Jones discloses a rotary brush (FIG. 3, No. 31) both of which are cylindrical and rotate about their cylindrical axis. The rotary brushes in Dutcher and Jones do not rotate in a plane as set forth in claim 1. Further, both Jones and Dutcher appear to show standard rotary brushes and there is no suggestion that the brush could be replaced with a floor cloth as set forth in claim 1. The rotating brush assemblies, shown in Dutcher and Jones are typically used for loosening

and lifting dirt from a carpet. With these cylindrical brushes, the contact area is spread along a line. This is in contrast to the claimed invention in which a floor cloth rotates in a plane substantially parallel with the cleaning surface. Thus, with the present invention, the contact area is spread across the entire planar surface of the floor cloth which is in contact with the cleaning surface.

Burgoon discloses scrub brushes for a scrubbing machine. Thus, Burgoon does not disclose the floor cloth as set forth in claim 1. Further, claim 1 states that the floor cloth is, "in the suction assembly." This also is not shown in Burgoon. Burgoon also does not show a dust collecting chamber, as set forth in claim 1.

It is respectfully submitted that independent claim 1 is not anticipated by either Dutcher, Jones, or Burgoon for the foregoing reasons. Accordingly, independent claim 1 along with all dependent claims 2-20 and new claim 28 are in condition for allowance. Consideration and favorable action are respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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MARKED-UP VERSION OF REPLACEMENT PARAGRAPHS

Replacement paragraphs for the paragraphs beginning at page 5, line 1 and ending at page 5, line 14:

As shown in FIGS. 2 through 4, the rotatable floor cloth driving apparatus according to the first preferred embodiment of the present invention includes a pair of rotary members 30 rotatably disposed on a lower portion of a suction port body 12 of the suction assembly 10 of the vacuum cleaner for supporting a pair of floor clothes 60, respectively, a rotation driving means ~~on-off~~—controlled through a manipulation of a driving switch 6 formed on a handle portion 5 (see FIG. 1) with an activated state and deactivated state for providing a driving force for rotating the rotary members 30, and a power supplying means 20 for supplying an electric signal from the manipulation of the driving switch 6 to the rotation driving means.

The power supplying means 20 is formed on the extension pipe 7 ~~in—near to—the~~ suction assembly 10, in a space separately defined by a protective cover 18 that screens the power supplying means 20 from an air path inclusive of the suction port 16. The power supplying means 20 is disposed in the space, and includes a power terminal 21 electrically connected to the driving switch 6 of the handle portion 5 and a power conductor 22 for electrically connecting the power terminal 21 with the rotation driving means.

Replacement paragraph for the paragraph beginning at page 5, line 24 and ending at page 6, line 3:

The pair of rotary members 30 ~~is~~are mounted on the lower portions of the transmission gears 42 for transmitting the rotational force from the rotational movement of the bi-directional rotary motor 50 to the floor clothes 60. The

rotary members 30 ~~are passed~~pass through the bottom surface of the suction port body 12 from the lower side of the suction port body 12, and connected to the transmission gears 42.

Replacement paragraphs for the paragraphs beginning at Page 6, Line 8 and ending at page 6, line 15:

~~Here,~~For cleaning the impurities on ~~the~~a cleaning surface more efficiently, it is preferable that the floor clothes 60 mounted on the rotary members 30 are rotated in ~~the opposite directions~~. Accordingly, it is preferable that the threads are formed on an outer circumference of the worm gear members 41 in an opposite direction, and the transmitting gears 42 are rotated in the opposite direction during the operation of the bi-directional rotary motor 50.

~~The undersigned reference numeral 14 refers to a protective cover for protecting~~ A protective cover 14 protects the power transmission unit 40.

Replacement paragraph for the paragraph beginning at Page 6, Line 16 and ending at Page 6, Line 22:

Meanwhile, as shown in FIG. 4, removing means 30a is provided on the lower ends of the pair of rotary members 30, respectively, for removably connecting the floor clothes 60. It is preferable that the removing means 30a is a fabric fastening member such as a Velcro® (hook and loop) fastener. Removable fabric layers 60a are uniformly formed on the upper surfaces of the floor clothes 60 that contact the rotary members 30, so that the floor clothes 60 can be attached and removed to/from the removing means 30a. It is preferable that the removing layer 60a is formed of a fabric that corresponds to the Velcro® (hook and loop) fasteners 30a.

Replacement paragraph for the paragraph beginning at page 6, line 23 and ending at page 7, line 5:

According to the second preferred embodiment of the present invention ~~as shown in FIGS. 5 and 6,~~ the rotation driving means includes a rotary motor 50 (in FIG. 2 and 3) and ~~a (in FIG. 2 and 3)~~ power transmission unit 40 (in FIG. 2 and 3). The power transmission unit 40 includes a transmission gear 42 (in FIG. 2 and 3) connected to the rotary members 30, ~~and (in FIG. 2).~~ As shown in FIGS. 5 and 6, worm gear members 41 and 41' having worm gear portions 41a and 41a' formed on the outer circumference of the worm gear members 41 and 41' and engaged with the transmission gears 42 (in FIG. 2), and connecting portions 41b and 41b' formed on respective ends of the worm gear members 41 and 41' and connected with the rotary shaft portions 50a and the bi-directional rotary motor 50 in a key-way.

Replacement paragraphs for the paragraphs beginning at page 7, line 9 and ending at page 7, line 17:

Here, as shown in FIGS. 5 and 6, the rotary shaft portions 50a have key portions 50b formed at ends of the rotary shaft portions 50a, while the connecting portions 41b and 41b' of the worm gear members 41 and 41' corresponding to the rotary shaft portions 50a have key grooves 41c and 41c' corresponding to the key portions 50b. The key portions 50b are such formed that the section of the key portions 50b are ~~in the non-circular shape~~. Accordingly, the key portions 50b are inserted in the key grooves 41c and 41c' ~~for a relative movement~~.

Accordingly, as the rotary shaft portions 50a of the rotary motor 50 are rotated, the key portions 50b are connected with the key grooves 41c and 41c' in a key-way, and the rotational force is transmitted to the worm gear members 41 and 41'.

Replacement paragraphs for the paragraphs beginning at page 8, line 1 and ending at page 8, line 12:

Compared to the general connecting methods, such as ~~connecting by joining~~ connecting member 51 (see FIG. 2), connecting the rotary shaft portions 43b with the key portions 41b and 41b' in a key-way can reduce the power loss during the power transmission from the rotary motor 50 to the gear members 41 and 41', and thus simplify and reduce the manufacturing process and cost.

FIG. 7 shows the rotatable floor cloth driving means according to the third preferred embodiment of the present invention, including ~~a~~ bi-directional rotary motor 50 and a power transmission unit 40. The power transmission unit 40 includes worm gear members 41 and 41' that have worm gear portions 41a and 41a' formed on the outer circumference of the worm gear members 41 and 41' and engaged with the transmission gears 42, and connecting portions 41e and 41e' formed on respective ends of the worm gear members 41 and 41' and screwed to the rotary shaft portions 50c of the rotary motor 50.

Replacement paragraph for the paragraph beginning at page 9, line 19 and ending at page 9, line 22:

Also, as shown in FIG. 8, the lower casing 25 has an opening 25a through which the transmission gears 42 are connected to the rotary members 30, and a plurality of fixing

brackets 25b as a mounting means that ~~is for~~ rotatably supporting both ends of the worm gear members 41, respectively.

Replacement paragraph for the paragraph beginning at page 10, line 5 and ending at page 10, line 9:

As shown in FIG. 8, the connecting protrusions 42a and the connecting holes 30a ~~is~~are shaped to have a non-circular cross-section. Accordingly, when the transmission gears 42 are connected to the rotary members 30, the power is transmitted from the transmission gears 42 to the rotary bodies 30 with the least power loss. In this embodiment, the section of the connecting holes 30a and the connecting protrusions 42a is octagonal.

MARKED UP VERSION OF AMENDED CLAIMS

1. (Amended) ~~An apparatus for rotatably driving a floor cloth employed in a suction assembly of a vacuum cleaner, the vacuum cleaner drawing in and collecting air and dust in a dust collecting chamber through an air path connecting a suction assembly to a connecting pipe by a negative pressure generated by an operation of a driving portion that is activated by manipulating a driving switch of a handle portion, the apparatus comprising:~~

a suction assembly;

a dust collecting chamber collecting air and dust through an air path, wherein the air path connects the suction assembly to a connecting pipe by a negative pressure;

a driving portion generating the negative pressure and activated by manipulating a driving switch disposed on a handle portion;

a floor cloth rotatably driven in the suction assembly to clean a cleaning surface, the floor cloth arranged in a plane;

a rotary member rotatably disposed on a lower end of the suction assembly, for supporting the floor cloth cleaning, wherein the floor cloth rotates in a plane substantially parallel to thea cleaning surface and the plane of the floor cloth;

rotary driving means on-off—controlled by the manipulation of the driving switch, wherein the driving switch supplies an activated state for supplying a driving force for rotatingto rotate the rotary member in an on-state; and

power supplying means for supplying an electric signal from the manipulation of the driving switch to the rotary driving means.

2. (Amended) The apparatus of claim 1, wherein the power supplying means is disposed ~~in on a separate space of the~~ connecting pipe that is protected from the air path by a protective cover ~~from the air path,~~ and includes a power terminal electrically connected to the driving switch of the handle portion, and a power conductor for electrically connecting the power terminal to the ~~power~~ rotary driving means.

3. (Amended) The apparatus of claim 1, the rotary driving means includes a bi-directional rotary motor having a pair of rotary shaft portions, wherein one of the pair of rotary shaft portions is formed on both each sides of the rotary motor and simultaneously ~~rotated~~ rotate with each other by the power supplied from the power supplying means, and the rotary shaft portions connect to a power transmission unit ~~disposed for transmitting the a~~ driving force of the rotary shaft portions to the rotary member.

4. (Amended) The apparatus of claim 3, wherein the power transmission unit includes a pair of worm gear members connected to the rotary shaft portions for ~~being rotated~~ rotation in the same direction as the rotary shaft portions ~~are rotated~~ rotate; and transmission gears meshed with the pair of worm gear members for converting a rotational force ~~of~~ in the direction the worm gear members rotate into a ~~perpendicular~~ rotational force in a direction perpendicular to the rotational direction of the worm gear

members and transmitting the converted rotational force to the rotary member.

6. (Amended) The apparatus of claim 4, wherein the worm gear members have threads formed on outer circumferences thereof in an opposite direction from each other, for ~~being~~ rotated rotation in the opposite direction when the transmission gears are rotated.

7. (Amended) The apparatus of claim 3, wherein the power transmission unit includes ~~a~~ transmission gears connected to the rotary member; and a worm gear member having a worm gear portion formed on ~~the~~ an outer circumference of the worm gear member for being meshed with the transmission gears, and a key portion formed on one end of the worm gear member for being connected to one of the pair of rotary shaft portions of the rotary driving means in a key-way.

8. (Amended) The apparatus of claim 7, wherein either the key portion of one of the pair of rotary shaft portions has a key groove having a non-circular section formed on one end, while either the key portion of one of the pair of rotary shaft portions without the key groove has a key portion that is formed on one end having corresponding shape to the key groove.

9. (Amended) The apparatus of claim 7, wherein ~~each of the~~ worm gear members ~~have~~ has threads formed on the outer circumference in an opposite direction so that the transmission gears can be rotated in the opposite direction.

10. (Amended) The apparatus of claim 3, wherein the power transmission unit includes ~~a~~ transmission gears connected to the rotary member; and a worm gear member having a worm gear portion formed on ~~the~~ an outer circumference of the worm gear member for being meshed with the transmission gears, and a connecting portion formed on one end of the worm gear member for being screwed to one of the pair of rotary shaft portions of the rotary driving means.

11. (Amended) The apparatus of claim 10, wherein ~~either one~~ of the connecting portion ~~or~~ and the rotary shaft portions has a male thread formed on the outer circumference, while ~~either one of the connecting portion ~~or~~ and the rotary shaft~~ portion without the male thread has a female thread formed on the end corresponding to the male thread.

12. (Amended) The apparatus of claim ~~10~~11, wherein the ~~threads~~ male thread and the female thread formed on the connecting portion and the rotary shaft portions are left-hand threads for screw-fastening when the rotary shaft portions ~~is~~ are rotated on the rotary ~~shaft~~ motor in a clockwise direction.

13. (Amended) The apparatus of claim ~~10~~11, wherein the ~~threads~~ male thread and the female thread formed on the connecting portion and the rotary shaft portions are right-hand threads for screw-fastening when the rotary shaft portions ~~is~~ are rotated on the rotary ~~shaft~~ motor in a counterclockwise direction.

14. (Amended) The apparatus of claim ~~10~~11, wherein the ~~threads~~ male thread and the female thread on the outer

circumferences of the worm gear members ~~are~~is formed in an opposite direction so that the transmission gears are rotated in the opposite direction.

15. (Amended) The apparatus of claim ~~1~~3, further comprising a casing member formed in the suction assembly for enclosing the rotary driving means, thereby screening the rotary driving means from the air path of the suction assembly.

16. (Amended) The apparatus of claim 15, wherein the casing member has a lower casing having openings formed on a bottom through which the ~~transmission gears~~power transmission unit ~~are~~is directly connected to the rotary members, ~~respectively,~~ and a plurality of fixing means for rotatably supporting the ~~worm gear members~~power transmission unit; and an upper casing connected to an upper portion of the lower casing for screening the rotary driving means mounted on the lower casing from the outside.

17. (Amended) The apparatus of claim 1, further comprising removable means for removably supporting the floor cloth onto the rotary members.

18. (Amended) The apparatus of claim 17, wherein the removable means includes at least one ~~Velcro~~hook and loop fastener disposed on a lower surface of the rotary members in a predetermined pattern.

19. (Amended) The apparatus of claim 18, wherein the ~~Velcro~~hook and loop fastener is seated on a plurality of recesses formed on the lower surface of the rotary members

around a center of rotation at a uniform distance from each other.

20. (Amended) The apparatus of claim 18, wherein the ~~Velcro~~ fastenerhook and loop fastener is disposed on the lower surface of the rotary member around the center of rotation at an angle of 120°.

28. (New) The apparatus of claim 1 wherein the plane of the floor cloth is arranged to be substantially entirely in contact with the cleaning surface.